


**PATENT**  
**10774.0033.NPUS00**

**APPLICATION FOR UNITED STATES LETTERS PATENT**  
**for**  
**LIGHT WEIGHT, FOLDABLE, AND REPLACEABLE**  
**FABRIC FAN BLADES**

**by**  
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## BACKGROUND OF THE INVENTION

The present disclosure relates generally to an improved ceiling fan assembly including lightweight, replaceable fabric ceiling fan blades.

Ceiling fans have relatively large blades, typically ranging from 36 to 52 inches, and usually ranging in number from three to five, all depending on the model of ceiling fan and motor. Each of the blades has a relatively flat cross-section that is angled relative to horizontal so that rotation in one direction will draw air downwardly and rotation in the other direction will draw air upwardly. Each of the blades is connected to the shaft of a fan motor via a connection member that connects with the inboard end of a blade and has an arm that connects with the shaft. Typically, ceiling fan blades are constructed of wood, but many are also constructed of other materials, including one or more polymeric materials.

It is known in the art that a ceiling fan can be customized by replacing each blade with another blade having a different color or design. Several companies also offer products that allow the user to further “decorate” ceiling fan blades in order to match a particular room décor. For example, U.S. Patent No. 5,516,264 describes a ceiling fan slipcover that consists of a fitted case for each blade that has a selected color, pattern, or design. Although this provides for the customization of ceiling fan blades, it has many drawbacks. First, it requires one slip cover for each blade. This not only increases the manufacturing costs for covering the several blades on each fan, but also decreases the performance and speed of the fan due to the additional weight on each blade. Second, the centrifugal forces created by the motion of the fan constantly acts to remove the

1 slipcovers, thus requiring significant retaining measures to abate the risk of imbalancing  
2 the fan due to loss of a slipcover.

3 What is needed is a ceiling fan blade that provides the customization advantages  
4 of the prior art, while overcoming the prior art's shortcomings.

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## SUMMARY OF THE INVENTION

A ceiling fan assembly is provided having a flexible and foldable frame made of tempered spring steel defining a plurality of blades, a replaceable one-piece fabric covering attached to the loops and defining a plurality of fan blades, and a frame holder that supports and positions the frame and attaches to a fan motor. In one embodiment, the covering is attached to the frame using a plurality of pockets that fittingly engages the plurality of loops. The fabric material is preferably stretchable, and is more preferably composed of a spandex material. The frame holder is constructed with pre-defined grooves sufficient to support and position the frame.

A method for displaying a visual display such as decoration for a home, office, or a special event is also provided. The fabric covering may include features such as colors, letters, numbers, words, pictures, symbols, designs, or any combinations thereof. The covering is replaceable with a new covering, thereby changing the visual display. Advertising for a product or service may also be provided. An advertiser provides a ceiling fan assembly as described herein for locations frequented by the public such as restaurants, bars, or other types of stores. The advertiser may then periodically send a new covering for the ceiling fan assembly to the place of business, thereby changing the advertisement for the product or service.

## BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the present disclosure may be obtained with reference to the accompanying drawings:

Figure 1 shows a perspective view of a ceiling fan assembly in accordance with the present disclosure.

Figure 2A shows an exploded view of the ceiling fan assembly of Figure 1.

Figure 2B shows a cutaway view of the latching mechanism for the frame holder.

Figure 3 shows the top view of the frame member with the covering attached and relative to the frame holder.

Figure 4 shows a first embodiment for attaching the fabric to the frame member.

Figure 5 shows a second embodiment for attaching the fabric to the frame member.

Figure 6 shows a frame member having three blades and having effective diameter  $D_1$ .

Figure 7 shows a frame member having five blades and having effective diameter  $D_2$ .

Figure 8 shows a frame member having seven blades and having effective diameter  $D_3$ .

Figure 9 shows an exploded view of a ceiling fan blade assembly in accordance with the present disclosure.

Figure 10 shows a cutaway of a single frame blade with covering attached and filter inserted.

1           Figure 11 shows the ceiling fan blade assembly of Fig. 9 assembled.

2           Figure 12 shows a cross-sectional view of a single fan blade of Fig. 11.

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## DESCRIPTION OF ILLUSTRATIVE EMBODIMENTS

The subject matter of the present disclosure will now be described more fully with reference to the accompanying drawings in which a preferred embodiment is shown. This disclosure may, however, be embodied in many different forms and should not be construed as being limited to the embodiments set forth herein.

Referring to Figures 1 and 2A, a ceiling fan assembly is shown in accordance with certain teachings of the present disclosure. The ceiling fan mount and motor (collectively 10) receives cover holder 12, which is attached by screws 14 or any other attaching means known in the art. The cover holder 12 is designed to receive frame holder 16, which attaches to cover holder 12 by twisting frame holder 16 such that its plurality of locking tabs 18 are engaged by the corresponding locking grooves 20 of cover holder 12. This locking motion is best shown in the Figure 2B cutaway. Optionally, a lighting fixture 22 may be attached to fan mount 10 and positioned within frame holder 16 and cover holder 12. For this reason, frame holder 16 is preferably constructed of a material conducive for emitting light, such as non-opaque glass or plastic.

Frame member 24 is preferably a single piece of tempered spring steel that is easily bendable and foldable. The tempered spring steel frame when unfolded provides a symmetrical plurality of loops that define a plurality of ceiling fan blades. Fabric 26 is constructed preferably in a one-piece design and is sized to substantially cover the plurality of loops of frame member 24 so as to form a plurality of fan blades 25 that directly corresponds to the plurality of loops. Frame holder 16 is designed with a plurality of frame guides or grooves 28 sized to receive and orient frame 24 such that the

1 resultant fan blades 25 are angled relative to horizontal so that rotation in one direction  
2 will draw air downwardly and rotation in the other direction will draw air upwardly.

3 Other flexible metal or plastic frames may be utilized in accordance with the  
4 principles of the present disclosure, but one skilled in the art will realize that such  
5 alternate materials may alter the flexibility/rigidity of the frame relative to tempered  
6 spring steel. It is preferred that frame member 24 be flexible enough to easily align  
7 within frame guides 28 of frame holder 16, yet rigid enough to hold its fan blade shape  
8 both during fan operation and when idle. It is also preferred that frame member 24 be  
9 flexible enough to fold the frame into a plurality of smaller concentric and substantially  
10 circular or oval loops that is compact for packaging, storage, shipping, and other business  
11 considerations. A foldable frame such as this is described in more detail in U.S. Patent  
12 No, 4,815,784 (herein incorporated by reference in its entirety), which discloses the use of  
13 flexible materials for windshield sun shades that are collapsible in a manner similar to the  
14 compact storage mode provided in the present disclosure.

15 Fabric covering 26 is preferably made of a spandex material, or any other material  
16 suitable for stretching the fabric tightly over frame member 24. Alternatively, fabric 26  
17 may be made of any material suitable for covering the frame and moving air during  
18 operation of the fan. Such alternative materials include, but is not limited to, cotton-  
19 based materials, paper-based materials, and polymer-based materials (such as  
20 polyethylene films and polyesters), however these materials may require additional  
21 features for attaching tightly to the frame.



1           Figures 3-5 illustrate two alternative methods for attaching fabric 26 to frame 24.  
2       In Figures 3 and 4, a pocket or envelope 30 is used to attach fabric 26 to the assembly by  
3       encompassing each blade within a corresponding pocket 30. In Figure 5, a more  
4       permanent method for attaching is depicted where a band 32 is created about the  
5       periphery of the fabric at each blade so as to receive at least a portion of each blade of  
6       frame member 24. Band 32 can be created using any means known in the art, including  
7       sewn stitches, buttons, snaps, velcro, etc. In both embodiments, fabric 26 is properly  
8       sized and tightly stretched over frame member 24 in such a way as to substantially  
9       minimize movement of fabric 26 during operation of the ceiling fan. One of skill in the  
10      art should appreciate that other alternative methods for attaching fabric 26 to frame 24,  
11      including but not limited to clasps, ties, elastic bands, tabs (secured by Velcro, snaps,  
12      buttons, etc.), or other mechanical means. Although not depicted in the figures, fabric 26  
13      may also be constructed with an opening in its center to provide space for frame holder 16  
14      to emerge through the fabric, thus providing direct light if the optional lighting package is  
15      utilized.

16           Turning now to Figures 6-8, three different embodiments of ceiling fan blade  
17      assemblies are generally shown. Figure 6 shows frame 100 forming a ceiling fan blade  
18      assembly 102 having three fan blades 104, 106, and 108. Ceiling fan blade assembly 102  
19      has an effective diameter  $D_1$ , where  $D_1$  is preferably 60 inches. In this regard, the  
20      “effective” diameter  $D_1$  constitutes the diameter of a circle circumscribed about the  
21      ceiling fan assembly 102. Figure 7 shows frame 200 forming a ceiling fan blade  
22      assembly 202 having five fan blades 204, 206, 208, 210, and 212. Ceiling fan blade

1 assembly 202 has an effective diameter  $D_2$ , where  $D_2$  is preferably 80 inches. Figure 8  
2 shows frame 300 forming a ceiling fan blade assembly 302 having seven fan blades 304,  
3 306, 308, 310, 312, 314, and 316. Ceiling fan blade assembly 302 has an effective  
4 diameter  $D_3$ , where  $D_3$  is preferably 100 inches. One skilled in the art should appreciate  
5 that a large number of combinations of number of blades and effective diameters can be  
6 achieved by utilizing the teachings of the present disclosure. One of skill in the art should  
7 appreciate that frame holder 16 would need to be configured with an appropriate number  
8 of frame grooves 28 to adequately receive and position a specific frame having a specific  
9 number of blades.

10 Figures 6-8 also illustrate an important advantage of the present disclosure. Each  
11 ceiling fan assembly (i.e. the frame covered by fabric) is significantly lighter weight than  
12 traditional ceiling fan blade assemblies typically found today having wooden or plastic  
13 fan blades. The disclosed assembly either requires a smaller fan motor, uses less power  
14 to operate at a given speed, or operates at a higher speed than is typically found in  
15 traditional ceiling fans today. Also, lighter weight systems such as those described herein  
16 provide for a larger number of fan blades than today's traditional three, four, or five blade  
17 models, and with longer effective diameters than what is typically used today. More  
18 blades, longer blades, and increased speed all result in increased air movement, which  
19 ultimately equates into reduced energy costs for the consumer.

20 Figures 9-12 provide more specific details for a preferred embodiment of the  
21 present disclosure. As shown in Figure 9, the "one-piece" fabric described above is  
22 actually constructed of two individual pieces of fabric 26a and 26b attached together

1 (such as by sewing). The top piece 26a is formed with slits 50 that form a pocket or  
2 envelope when piece 26a is attached to piece 26b. Each pocket is sized so as to receive a  
3 loop of frame 24, as is shown by broken lines 52 in Figure 9. Additionally, air filter 54  
4 may be inserted into the sleeve as well to remove dust during the operation of the ceiling  
5 fan assembly. Air filter 54 is preferably constructed from paper or felt materials, and is  
6 designed so as to fit snugly within the sleeve along with frame 24, as is best shown in  
7 Figure 12. Alternatively or in combination with air filter 54, a separate insert (not shown)  
8 may also be inserted into the sleeve that acts to deodorize the room during operation of  
9 the ceiling fan. Such a deodorizing insert may be constructed from paper, for example,  
10 steeped in a deodorant. Alternatively, air filter 54 and the deodorizing insert can be  
11 combined into a single insert composed of an air filter having been steeped in a  
12 deodorant. It is also preferred that any insert, whether it is an air filter, deodorizer, or  
13 combination, be constructed so that it can be fully enclosed between pieces 26a and 26b,  
14 as is best shown by the phantom lines 56 in Figure 11, thereby hiding slit 50 from the  
15 look-up view.

16 Another advantage of the present disclosure is the reduction of imbalancing  
17 caused by uneven weight distribution amongst the fan blades. This is typically caused in  
18 today's ceiling fans by warped blades, damaged blade mounting brackets, or, as described  
19 above, a lost slipcover on one blade. The lightweight nature of the ceiling fan assemblies  
20 described herein provides little bias towards a particular blade. Also, the flexible frame,  
21 the dome cover, and the stretchable fabric provide a consistently uniform and  
22 symmetrical shape during operation, which minimizes the possibility of imbalance.

1           Yet another advantage of the present disclosure relates to its alternate utility as a  
2       visual display. The ceiling fan covering can be used to provide custom decorating for a  
3       ceiling fan located in a home, office, place of business, or at a special event such as a  
4       birthday party or reception. The visual display may be created by providing different  
5       fabric materials sewn together to form the fabric covering or by applying printing onto the  
6       fabric by any means known in the art, including but not limited to screen printing, direct  
7       printing, and transfer printing. Typically, the visual display will include features such as  
8       colors, letters, numbers, words, pictures, symbols, designs, or any combination of the  
9       above. By replacing the fabric covering on the ceiling fan assembly, the new covering  
10      can be used to change the visual display. As an illustration, a ceiling fan in a home can  
11      have a first fabric covering having colors and designs that match the décor of the room,  
12      such as a wall color or a curtain design. However, a new fabric covering having festive  
13      colors and designs and the message “Happy Birthday!” can be used instead, for example,  
14      for a child’s fifth birthday party. Yet another fabric covering can be used during holidays,  
15      such as Christmas for example, to convey a festive theme.

16           Fabric coverings in accordance with the present disclosure can also be used to  
17      advertise in locations frequented by the public. For example, advertising contained on the  
18      covering may promote a company, a product, or an event such as a concert, the Super  
19      Bowl, or a charity event. An example of such advertising includes printing a product  
20      slogan on the covering, as shown in Figure 2A at 29 (“Drink Super Cola”). Examples of  
21      locations where such advertising may be effective includes restaurants, bars, grocery  
22      stores, department stores, sporting goods stores, or any other facility open to the public

1 where such advertising may be effective. By replacing the fabric covering on the ceiling  
2 fan assembly, a new covering can be used to change the advertising. For example, a  
3 fabric covering on a ceiling fan at a bar may contain advertising for a beer company.  
4 However, a new fabric covering can be used to advertise for a contest being sponsored by  
5 the bar. Yet another fabric covering can be used prior to a major sporting event to  
6 advertise drink specials or other promotionals. Furthermore, a manufacturer of goods or  
7 services may effectuate such advertising by providing, by mail for example, new  
8 coverings to the owners of such locations so that the owner can change the advertisement  
9 as described herein.

10 It will be apparent to one of skill in the art that described herein is a novel  
11 lightweight, replaceable fabric ceiling fan blade assembly. Also described herein is a  
12 novel method for using such a ceiling fan assembly to provide a visual display and to  
13 advertise. While the invention has been described with references to specific preferred  
14 embodiments, it is not limited to these embodiments. The invention may be modified or  
15 varied in many ways and such modifications and variations as would be obvious to one of  
16 skill in the art are within the scope and spirit of the invention and are included within the  
17 scope of the following claims.

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